

**CE-5****Tolaasin Forms Various Types of Ion Channels in Lipid Bilayer**

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Tolaasin is a channel forming bacterial toxin produced by *Pseudomonas tolaasii* and causes a brown blotch disease on cultivated oyster mushrooms. When tolaasin molecules form channels in the membranes of mushroom cells, they destroy cellular membrane structure, known as 'colloid osmotic lysis'. In order to understand the molecular mechanisms forming membrane channels by tolaasin molecules, we have investigated the electrophysiological characteristics of tolaasin-induced channels in lipid bilayer. Various types of ion channels were identified based on their gating behaviors and slope conductances. The channels were classified into at least four major types which showed different gatings and conductances, such as 150 pS, 250 pS, 400 pS, and 500 pS. Three types of tolaasin-induced channels showed linear current-voltage relationships and one rectified. Divalent ions,  $Zn^{2+}$  and  $Ca^{2+}$ , have been known to block the tolaasin-induced hemolysis. When the effects of divalent ions were investigated,  $Zn^{2+}$  decreased the channel activity by reducing the frequency of channel openings and  $Ca^{2+}$  decreased  $P_o$  by changing the gating of the channel to slow opening mode. Previously, we suggested that the multimerization of tolaasin molecules is prerequisite for the formation of membrane pores. Although it is not clear how tolaasin forms several types of channels, the various multimerization of tolaasins may be responsible for the formation of different channels.